

T01D05 – Classwork II: Acid Nomenclature

Name _____

The naming of acids is different from naming ionic or molecular compounds. Acids are molecular compounds that are dissolved in water. Essentially there are two different types of acids. One type is called binary acids and they consist of two elements: Hydrogen and any non-metal with the exception of oxygen, and oxyacids which consists of three or more elements: hydrogen and a polyatomic ion containing oxygen. Each has its own process for naming.

BINARY acids (Two elements-Hydrogen and any non-metal except oxygen)

Again when making a compound the positive ion (cation) and negative ion (anion) must equal zero. Remember these are molecular compounds. Hydrogen which is a +1 (and written first) will combine with non-metals of families 14, 15, 16 and 17 to form acids.

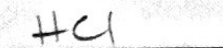
If hydrogen combines with sulfur then we have the compound H_2S , and when put into water solution we would call this hydrosulfuric acid. If H reacts with nitrogen we form H_3N , and if put into water solution we would have hydronitric acid.. Compounds have to have a neutral charge (pluses must equal minuses).

All binary acids always begin with the word *hydro*, and end with *ic*. The non-metal may or may not change its form. Sulfur stays sulfur (H_2S is hydrosulfuric acid) but nitrogen changes to nitr (H_3N is hydronitric acid). These take practice as does all of chemistry.

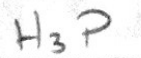
Try the following.

Write the formula for the following binary acids.

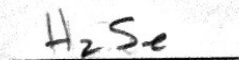
hydrochloric acid



hydrophosphoric acid



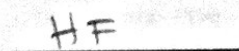
hydroselenic acid



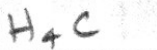
hydroiodic acid



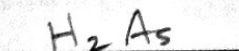
hydrofluoric acid



hydrocarbonic acid



hydroarsenic acid



hydrobromic acid



Write the name of the following binary acids.

 H_2Se hydroselenic acid HCl hydrochloric acid HF hydrofluoric acid HI hydroiodic acid H_3As hydroarsenic acid H_3N hydronitric acid

Addition or Removal of H atoms from an Oxoanion

Remember an acid is a substance that has the ability to yield H^+ ions, therefore an oxoacid can lose or gain H atoms. These are the following rules for naming the oxoanions (charged oxoacid compounds). The chart above can also be used for the naming of oxoanions.

1. When all the H ions are removed from the "-ic" acid, the anions name is "-ate"
2. When all the H ions are removed from the "-ous" acid, the anions name is "-ite"
3. Name of anions in which one or more *but not all* of the H ions are removed, we must indicate the number of H ions still present by using the greek prefixes (omitting mono-)

H_3PO_4	phosphoric acid (the "-ic" form)
$H_2PO_4^-$	dihydrogen phosphate (lost 1 H ion, but not all)
HPO_4^{2-}	hydrogen phosphate (lost 2 H ions, but not all)
PO_4^{3-}	phosphate (lost all the H ions from the "-ic" form)

Try these....

Write the correct formula for these oxyacids.

chloric acid $HClO_3$

phosphorous acid H_3PO_3

iodic acid HIO_3

carbonic acid H_2CO_3

nitric acid HNO_3

nitrous acid HNO_2

perbromic acid $HBrO_4$

hypochlorous acid $HClO$

phosphoric acid H_3PO_4

oxalic acid $H_2C_2O_4$

chlorous acid $HClO_2$

tartaric acid $H_2C_4H_4O_6$

Write the name for these oxyacids.

$HClO_2$ chlorous acid

$HBrO_3$ bromic acid

H_3PO_3 phosphorous acid

$HClO_4$ perchloric acid

$HC_2H_3O_2$ acetic acid

HCN cyanic acid

$HMnO_4$ manganic acid

$HClO$ hypochlorous acid

$HClO_3$ chloric acid

H_2CrO_4 chromic acid

Again just because I can write the formula for or name an oxyacid does not mean that it exists. This is all there is to naming acids. You have to keep them straight and remember practice, practice, and more practice makes you good at doing this. We will use nomenclature all year long. You must remember it for the entire year.